

**SHIP PRODUCTION COMMITTEE
FACILITIES AND ENVIRONMENTAL EFFECTS
SURFACE PREPARATION AND COATINGS
DESIGN/PRODUCTION INTEGRATION
HUMAN RESOURCE INNOVATION
MARINE INDUSTRY STANDARDS
WELDING
INDUSTRIAL ENGINEERING
EDUCATION AND TRAINING**

**September 1985
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THE NATIONAL SHIPBUILDING RESEARCH PROGRAM

**1985 Ship Production Symposium
Volume I
Paper No. 1:
Overview of Panel SP- 1/3 - Facilities
and Environmental Effects**

**U.S. DEPARTMENT OF THE NAVY
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PANEL SP-1/3

FACILITIES & ENVIRONMENTAL EFFECTS

Richard A. Price
Avondale Shipyards

Chairman

FACILITIES/ENVIRONMENTAL EFFECTS (Panel SP-1/3)

PANEL CHARTER

The primary objective of this program is to reduce cost, improve productivity and reduce the time required for new ship construction, conversion and repair in the shipbuilding industry through the implementation of new technology,

The panel members must be involved with daily operation at their shipyard and be considered an integral part of their shipyard operations. The panel must be versatile and equipped to handle a variety of tasks which will improve productivity and producibility both in the short term and long range through operation analysis.

Operations analysis may be defined as "A Systematic Procedure", employed to study all of the factors which affect the method of performing an operation in order to achieve maximum over-all economy. Through this study the best available method of performing each necessary part of an operation is found, and new manufacturing and maintenance developments are implemented as they become available; or are developed through research, in the continuing effort to move every job one step closer to continuous automatic accomplishment.

No single operation can be considered as a part of the more or less complicated process of manufacture being used. The effect of any change may be considered in the light of the entire present process of manufacture,

Only in this way, can we be sure that the suggested improvement will really produce positive results.

The program addresses all phases of ship construction, including fabrication, assembly erection, outfitting and required shipyard services. The program also includes Environmental Effect (panel SP-3) considerations involved in facility expansions, and modifications, operations and ship production from a regulatory point of view.

PANEL SP-1 SHIPYARD FACILITIES AND ENVIRONMENTAL EFFECTS

The objective of this program is to assist U.S. shipyards in reducing cost and construction time through the development and implementation of efficient equipment and facilities and improved work flow arrangements. The program addresses all phases of ship construction, including fabrication, assemble erection, outfitting and required shipyard services. The program also includes Environmental Effects (Panel SP-3) considerations involved in facility expansions, and modifications, operations and ship production from a regulatory point of View.

FACILITIES

I. BACKGROUND

The ship Production Committee of the Society of Naval Architects and marine Engineers re-activated Panel SP-1 Facilities July 20, 1978.

Avondale Shipyards, Inc. accepted the chairmanship and agreed to be the primary sponsor. Presently we have 25 active members from 17 shipyards plus MarAd and Navy representation.

During the July 1978 meeting of Panel SP-1 (Facilities), it was suggested that the panel develop a consensus specification for long range facility plans. The purpose of the consensus specification is to provide a standard format and criteria for the development of facility plans. This would be a tool for use by MarAd and a specific shipyard in conjunction with the proposed facility modernization planning program.

A five-day working conference was held in Atlanta, Georgia. Twenty-two (22) representatives from twelve (12) major shipyards attended the five-day conference and currently have a common approach for the development of long range plans.

The second step of this effort was to prepare a proposal, on a voluntary basis, for one or more shipyards to develop a long range plan for their respective yard. The detailed proposals were submitted directly to MarAd.

Panel SP-1 (Facilities) currently has a three phase objective emphasizing improved productivity.

Phase I - Enhance the Shipbuilding Industries Long Range Facilities Plan
Efforts

Phase II - Determine a Feasible method of Instituting a Cooperative High Risk
Facilities Program.

Phase III - Determine a Feasible Method of Instituting a Cooperative Facilities
Modernization Program

Our efforts are directed toward achieving this three-phase objective, placing emphasis on cost effective producibility.

ENVIRONMENTAL

I. OVERVIEW

During 1978, we recommended that Panel Sp-1 and SP-3 (Shipyard Environmental Effects) be combined onto one panel. the logic being that the functional responsibility generally falls under the facilities development. We thought the combined panel would consolidate our industry's efforts regarding industry consensus input during the comment period of proposed federal regulations.

We coordinate our efforts with Shipbuilders Council of America Environmental Committee when dealing with governmental agencies such as the Environmental Protection Agency, the Department of Labor (OSHA), the U.S. Coast Guard, and the Department of the Navy. The shipyards, on an individual basis, have to address their respective state and local regulatory agencies to meet the intent of their regulations.

II. OBJECTIVE AND BACKGROUND

During the proposal period, part of our commitment is to ensure that the regulations are feasible regarding compliance as well as cost effectiveness. We have submitted comments to regulatory bodies as well as conducted independent studies to establish guidelines for use in the development of cost effective regulations.

We have focused on such issues as: (1) Draft Development Document for the Shipbuilding and Repair Industry Drydock Points Source Category; (2) methods of receiving sewage from vessels using drydock facilities; (3) programs for complying with national Pollutant Discharge Elimination Standard Permit requirements; (4) penalties for violation of Federal Water Pollution Control Act (FWPCA); (5) certificates for financial responsibility; and (6) the OSHA Blasting Standard Development Document.

During the recent past the shipbuilding and repair industry through Panel SP-1 (SNAKE) and the Environmental Committee of SCA have focused our attention on hydrocarbon emissions. Several approaches have been considered; changing the solvent, inhibiting the photochemical reactivity (Rule 66 Calif.) developing high solid coatings, developing water base coatings, utilizing carbon absorption and/or incineration. Carbon absorption or incineration can provide 90% emission control, however, the cost impact is prohibitive. In most cases, this type of emission control could cost as much as the paint building. During the past 3 to 5 years most mil spec and commercial paints comply with Rule 66. It must be noted that the shipbuilding and repair industry uses the paint specified by the owners in most cases. Panel 023-1 of SNAME Ship Production Committee has accomplished substantial gains in the use of high solid low solvent coating.

The industry effort is over and above Rule 66 compliance. Research and Development of effective water base coatings for ships is being conducted. Under the Reagan Administration the volume of proposed regulation has definitely declined. Most shipyards are occupied with compliance to existing regulation in such areas as the consolidated NPDES Permits, RCRA; hazardous Waste, hazardous Material; Individual approaches. Regarding filing as a transporter, generator, treater, disposer and storage of Hazardous Waste. SP-1 continue to keep abreast of regulatory changes which may adversely influence the shipbuilding and repair industry.

PANEL SP-1
SHIPYARD FACILITIES AND
ENVIRONMENTAL EFFECTS

ROSTER

Avondale Shipyards, Inc.
Chairman, SP-1/3

National Steel & Shipbuilding Co.

Bethlehem Steel Corporation

Ingalls Shipbuilding

Bath Iron Works

General Dynamics Corporation

Peterson Builders, Inc.

St. Louis Ship

Todd Pacific Shipyard - LA Div.

Maritime Administration

Newport News Shipbuilding & Drydock

McDermott Shipyards

Lockheed Shipbuilding

Naval Material Command

PROJECTS COMPLETED

1. Material Handling Equipment Study - Volume I and II - 1973
2. Feasibility Study of Semi-Automatic Pipe handling System and Fabrication Facility - 1978
3. Feasibility Study on Development of an Economical System for Cleaning Dry Docks Prior to Flooding - 1978
4. Requirements Report Computer Software System for a Semi-Automacit Pipe Shop - 1980
5. Beam Line Feasibility Study - 1981
6. Long Range Facilities Planning
 - a. Todd Pacific Shipyards Corp., Los Angeles Division - 1981
 - b. National Steel & Shipbuilding Co. - 1982
 - c. Peterson Builders, Inc. - 1982
 - d. Avondale Shipyards, Inc. - 1983

PROJECTS RECENTLY COMPLETED

1. IHI Survey of AS1 and the Development of a Long Range Facilities Plan
February-1983
2. Pipe Shop Implementation - Phase II - March-1983
3. Implementation of IHI Technology at AS1
 - a. Production Planning and Scheduling May-1982
 - b. Design Engineering For Zone Outfitting June-1982
 - c. Mold Loft, Production Control, & Accuracy Control November-1982
 - d. Process,Lanes & Design Engineering June-1984
4. Web Line Feasibility Study December-1984
5. Implementation of Process Lanes February-1984
6. Nesting and Marking System April-1985
7. Crane Analysis May-1985
8. Metal Forming System April-1985
9. Fitting & Welding Cylinders April-1985

PROJECTS IN PROGRESS

- 1) SP-1-83-05
Group Technology/Flow Applications in Shops - Phase I
- 2) SP-1-83-06
Portable Flushing System for Shipboard Piping System Cleaning
- 3 SP-1-84-01
Pipe Storage and Movement
- 4) SP-1-84-02
Feasibility Analysis of An On-Line Material Order/Delivery System
- 5) SP-1-84-03
Moving Personnel-h Light Material Onto A Ship and About A Shipyard

PROJECTS APPROVED FOR FY-85

- 1) SP-1-85-01
Comparison of U.S. and Foreign Cost for Shipbuilding Material and Components, Phase I
- 2) SP-1-85-02
Cost of Effective Maintenance and Repair of Air compressors
- 3) SP-1-85-03
Staging Systems for Ships During New Construction and Repair
- 4) SP-1-85-04
Evaluation of Smoke Extraction Systems versus Ventilation

MAJOR PRODUCTIVITY GAIN

SP-1 FACILITY
Manufacturing Technology
R & D By U.S. Shipyards In
Cooperation with the National Shipbuilding
Research Program

PROJECT	ESTIMATED/ACTUAL SAVINGS
o Pipe Shop	37.5%
o T-Drill	25%
o Tech (IHI)	15%
0 Process Lanes	15%
0 Beam Line	65%
o Web Line	30%

Normalized Productivity Gains
 Projected from R&D Effort
 Contingent on Magnitude of
 New Construction Work Load

<u>Project</u>	<u>Cost R&D and Implement \$ Millions</u>	<u>Anticipated Savings \$000 M/H COO</u>	<u>Anticipated Savings at 20.00 M/H</u>	<u>Savings Applied By</u>
Pipe Shop	5.7	M/H79.6	\$1.6	Ship Set
Beam Line	4.6	M/H72.2	\$1.4	Year
Web Line	5.4	M/H43.0	\$ -9	Ship Set
T-Drill	.2	* 288.3	* .3	Ship Set
IHI	4.2	M/H255.0	\$4.5	<i>Year</i>
Process Lanes	2.2	36.0	\$.7	Ship Set

* Mixed Savings Purchased Items & Manhours.

** Implemented with Benefits being shared by customers and yard.

COST OF FIXED JIGS COMPARED TO PIN JIGS

STEEL COST -725 TONS AT 400.00 = \$290,000.00

LABOR COST- = \$ 36,023.00

TOTAL FIXED JIG COST LIMITED TO
SINGLE CONTRACT - - \$326,023.00

PIN JIG COST LABOR AND MATERIAL
CAN BE USED FOR ALL CONTRACTS = \$175,000.00

NOTE- DOES NOT CONSIDER UPGRADE TRAINING FOR LINE HEATING BURNERS TO IMPLEMENT
THE PIN JIG CONCEPT

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